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(11) CA 2 236 137 (13) A1
(43) 29.10.1999

(12)

(21) 2 236 137

(51) Int. Cl.[6]: B65D 081/03, B65D 081/38

(22) 29.04.1998

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(54) SAC DE TRANSIT ISOLE
(54) INSULATED TRANSIT BAG

(57)

The insulated transit bag is made from bubble-wrap material, bonded to aluminum foil. The material is doubled-over, folded, and heat welded to form sealed seams. The bag is used for transporting heat-sensitive medicines etc.

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(12)(19)(CA) **Demande-Application**

(21)(A1) **2,236,137**
(22) 1998/04/29
(43) 1999/10/29

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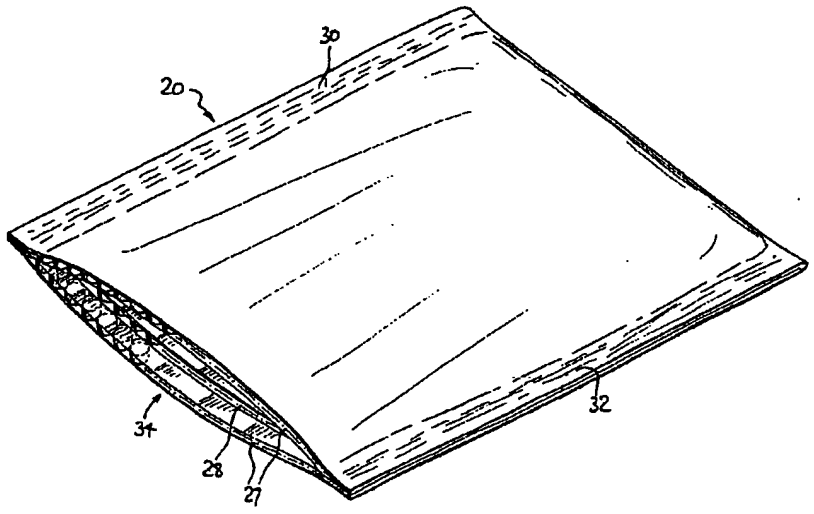
(51) Int.Cl.[6] B65D 81/03, B65D 81/38

(54) **SAC DE TRANSIT ISOLE**

(54) **INSULATED TRANSIT BAG**



(57) The insulated transit bag is made from bubble-wrap material, bonded to aluminum foil. The material is doubled-over, folded, and heat welded to form sealed seams. The bag is used for transporting heat-sensitive medicines etc.

Abstract

The insulated transit bag is made from bubble-wrap material, bonded to aluminum foil. The material is doubled-over, folded, and heat welded to form sealed seams. The bag is used for transporting heat-sensitive medicines etc.

Title: INSULATED TRANSIT BAG

This invention relates to transit bags or pouches for containing special contents, and particularly temperature-sensitive medicines, for transport of the contents by mail, or by courier.

BACKGROUND TO THE INVENTION

Many medicines lose their efficacy if kept for more than a few hours at the wrong temperature. Insulin, for example, deteriorates if allowed to rise above about 15 degC for more than an hour or two. As a result, insulin cannot be sent through the post. Generally, insulin cannot even be sent by overnight-courier.

Special medical courier services are available, but they are inordinately expensive for everyday items. Persons who have need of temperature-sensitive medications, therefore, when travelling, have to have the medications made up by a local pharmacist. Such persons would much prefer their prescriptions to be made up by their home pharmacist, if only there were an inexpensive means for transporting the prescriptions.

The invention is aimed at providing a transit bag that can contain a prescription quantity of insulin, and which is sufficiently thermally insulated to enable the insulin to be maintained at a temperature of less than 15 degC, during transit, for a period of about two days. The invention is aimed at providing a bag which is also light in weight, and inexpensive to manufacture.

As will be apparent from the descriptions herein, the bag can be designed for the transport of items other than insulin prescriptions.

GENERAL FEATURES OF THE INVENTION

The material from which the bag of the invention is made is a

composite or lamination of a plastic bubblewrap sheet and aluminum foil. The aluminum foil is bonded or welded to the bubbles of the plastic bubblewrap sheet.

The composite sheets are arranged one inside the other, with the aluminum of the inner composite sheet facing inside, and the aluminum of the outer composite sheet facing outside. The composite sheets are welded or otherwise secured together at the edges to form a pouch, and an open mouth is left for inserting the temperature-sensitive contents. The mouth can be welded closed, or otherwise closed, after the contents are inserted.

The bubblewrap material provides excellent thermal insulation, in that air is trapped inside the bubbles. Also, because the aluminum foil is laminated to the bubbles, the spaces between the bubbles are also confined, and the air is trapped in those spaces too. (Still air is, of course, one of the best insulators known.) The aluminum foil provides protection against radiant heat transfer. The aluminum foil also provides structural robustness to the outside of the bag, as a protection against the inevitable minor knocks that occur during transport and handling. It may be noted that although the aluminum is thin, it is structurally well-supported, because the bubblewrap material provides many surfaces that lie at right-angles to the plane of the foil.

As will be explained, the bag can be designed to be inflated, after the contents are inserted, which provides good structural rigidity, good shock-absorption, and improved thermal insulation. Even so, the bag is light in weight (which of course is important in a transportation bag) and inexpensive to manufacture and use.

The inside aluminum foil provides a robust surface against which the contents can bear directly. The inside of the bag, though mechanically robust, generally does not need to be liquid-tight, because liquid medicines, and other liquids being transported, would in any case be placed in a liquid-tight sachet or other suitable container prior to being placed in the bag. On the other hand, by configuring the bubble material in different ways, as will be explained, the inside of the bag can be liquid-tight if desired.

The bag is not (quite) light-tight. However, the bag provides excellent protection against, for example, U/V and other radiation to which some items can be sensitive. In fact, the use of the bag, with its metal shielding, might make it difficult for authorities to detect some illegal substances. Where that is a possibility, bags containing approved contents might be provided with pre-cleared-customs identification. The bag as described herein is suitable for this function, in that it is easy for the designer to ensure that any tampering with the sealed bag, either though the metal itself, or through the sealed edges, would inevitably be apparent.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

By way of further explanation of the invention, exemplary embodiments of the invention will now be described with reference to the accompanying drawings, in which:

Fig 1 is a pictorial view of a thermal bag that embodies the invention, the bag being shown open and ready to receive contents;

Fig 2a is a diagram of the configuration of a sheet that is a composite of the bubble-wrap material and aluminum foil, from which the bag of Fig 1 is made;

Fig 2b is a diagram of the configuration of an alternative composite;

Fig 2c is a diagram of the configuration of an alternative composite;

Fig 3 is a pictorial view of some components of the bag, shown at a stage during manufacture;

Fig 4 is a cross-section on line 4-4 of Fig 1;

Fig 5 is a cross-section on line 5-5 of Fig 1, and shows the bag at a subsequent stage of manufacture;

Fig 6 is a pictorial view similar to Fig 3, of some components of a second bag that embodies the invention;

Fig 7a is a cross-sectional view, showing the mouth of the second bag;

Fig 7b is the same view as Fig 7a, and shows the bag in a fully closed condition;

Fig 8 is the same view as Fig 5 of a third bag that embodies the

invention;

Fig 9 is the same view as Fig 1 of a fourth bag that embodies the invention.

The apparatuses shown in the accompanying drawings and described below are examples which embody the invention. It should be noted that the scope of the invention is defined by the accompanying claims, and not necessarily by specific features of exemplary embodiments.

The bag 20 shown in Fig 1 is suitable for the containment, during transportation, of thermally-sensitive items, such as medicines and perishable materials.

The material from which the bag is made is shown in more detail in Figs 2a,2b,2c. The material itself is conventional, and is based on the common polyethylene bubble-wrap material. In Fig 2a, a layer 60 of aluminum foil, which is typically about 0.002 inches thick, is provided with a film 62 of polyethylene, which is about 0.003 inches thick. The plastic film 62 is in intimate bonded adherence to the aluminum foil layer 60.

The combined plastic-aluminum sheet 63 is welded to a bubble sheet 64 of plastic film, by passing the bubble sheet and the plastic-aluminum sheet between rollers, under such conditions of heat and pressure as will cause welding. The bubbles 65 are formed in that the roller against which the bubble sheet 64 contacts is provided with many recesses, each with a vacuum supply, into which the film of the bubble sheet is drawn. Composite sheet 67 is the result of welding the plastic-aluminum sheet 63 to the bubble sheet 64.

The bubbles 65 have a diameter of about 0.4 inches, and are arranged in regularly-pitched rows.

In Fig 2b, a composite sheet like the sheet 67 of Fig 2a is provided with a backing sheet 68 of plastic film. The backing sheet 68 is welded to the tops of the bubbles 65, again by passing the composite sheet 67 and the backing sheet 68 between rollers under conditions of heat and pressure. Now, the backing sheet 68 is compressed between the roller and the tops of the

bubbles 65, whereby some skill is needed to ensure that the backing sheet 68 adheres properly to the tops of the bubbles, but such skill is within the competency of a skilled manufacturer.

The final composite sheet 69 in Fig 2b can be used in a bag that embodies the invention, as can the composite sheet 67 of Fig 2a.

Fig 2c shows another variation. Here, a backing sheet 68 and a bubble sheet 64 are pressed together by passing the two films between rollers, under conditions of heat and pressure, as described. Then, the plastic-aluminum sheet 63 is pressed onto the tops of the bubbles, again as described. The resulting composite sheet 70 can also be used in a bag that embodies the invention.

Other variations to the manner of arranging the sheets are also possible. For example, two of the composite sheets as shown in Fig 2a can be pressed together, bubble-to-bubble, to form a single bonded sheet.

As shown in Fig 3, the bag 20 is made from an outer composite sheet 27 and an inner composite sheet 28. Whether the composite sheet is the sheet 67 of Fig 2a, the sheet 69 of Fig 2b, or the sheet 70 of Fig 2c, or some other variation, generally the designer will prefer to use the same type of sheet throughout. In making the bag, the outer composite sheet 27 and the inner composite sheet 28 are assembled with the respective plastic base layer 23 sides of the sheets together, i.e with the aluminum foil 25 sides of the sheets outermost.

A crease 29 is made in the outer and inner composite sheets 27,28. The crease 29 is folded over, until all four thicknesses of the sheets overlie each other.

The composite sheets are welded together along the left and right side margins 30,32, as shown in Fig 4, thus forming the sheets into a rectangular pouch or bag, which is closed on three edges, and has an open mouth 34 on the fourth edge. The top thickness 35 of the bag comprises half of the inner composite sheet 28 and half of the outer composite sheet 27, and the bottom thickness 36 of the bag comprises the other halves of the composite sheets.

The aluminum foil of the outer composite sheet faces outwards, and the aluminum foil on the inner composite sheet faces inwards and lines the inside of the bag.

It may be noted from the drawings that the aluminum foil 25 of the inner composite sheet 28 does not extend to the edges of the bubbles 24 of the inner sheet. The aluminum foil of the inner sheet is short, and leaves bubble-exposed margins 37 to left and right of the inner composite sheet. In respect of the outer composite sheet 27, there are no bubble-exposed margins, but rather the aluminum foil 25 of the outer sheet covers the whole area of the bubbles of the outer sheet, and is co-extensive with the base layer 23 of the outer composite sheet.

Because the aluminum foil 25 of the top and bottom halves of the inner sheet 28 does not extend to the edge of the inner sheet, when the left and right margins 30,32 of the top and bottom thicknesses 35,36 of the bag are squeezed together, it is the respective plastic base layers 23 of the inner and outer composite sheets 27,28 that come together in direct contact (Fig 4). Thus, at the margins 30,32, the aluminum is not present between the sheets, whereby the plastic of the inner and outer sheets of the top and bottom thickness of the bag can all be welded together.

The side margins of the bag are sealed and secured as described above. The mouth of the bag 20 is also sealed and secured, in a manner as will now be described.

In the bag depicted in Fig 1, the inner composite sheet 28 has been cut shorter (lengthwise) than the outer composite sheet 27, and, as shown in Fig 5, the end-edges of the inner sheet are secured to the outer sheet by means of adhesive tape 43. (The tape 43 is not shown in Fig 1.) To seal the bag after the contents have been inserted, the top and bottom portions of the outer layer can be pressed and welded together. In shown in Fig 5, the adhesive tape 43 is provided to guide the items to be placed in the bag into the correct place: if the tape were omitted, a careless person might insert the item between the inner and outer composite sheets, rather than between the two halves of the inner composite sheet.

Figs 6,7a show an alternative arrangement of the sheets at the mouth of the bag. As shown in Fig 6, the aluminum foil is absent from the ends of the inner composite sheet, thus exposing the bubbles at end-margins 38,39, just as the bubbles at the side margins are exposed. As shown in Fig 7a, the inner and outer sheets 28,27 of the top thickness 35 are squeezed and pre-welded together, at 40, during manufacture of the bag, as are the inner and outer sheets 28,27 of the bottom thickness 36, at 41. Again, it may be noted that the aluminum foil 25 stops short, and leaves end margins 38,39 of exposed bubbles of the inner sheet 28.

After the contents have been inserted into the bag, the bag is sealed. This is done by pressing the pre-welded portions 40,41 between heated bars 42, which welds the then-touching plastic together. As shown in Fig 7b, after that, the mouth of the bag lies sealed in much the same manner as the side margins of the bag.

In the alternative shown in Fig 8, a piece of adhesive tape 45 is provided for sealing the mouth of the bag shut after the contents have been inserted. The tape 45 is provided with a peel-off backing strip 46, which is removed just before the tape 45 is folded over and pressed against the aluminum foil 25 in the area 47 of the bottom 36 of the bag. It may be noted that flat aluminum foil is well suited to being adhered to by the tape.

Also, in Fig 8, it may be noted that the bag is made from a single composite sheet 48, which is doubled and folded over, as shown, to form the inner and outer sheets 28,27 of the top and bottom thicknesses 35,36 of the bag. In this case, the aluminum foil 25 is discontinuous, in that the foil does not extend over the bottom lip 49 of the mouth of the bag.

It will be noted that, in the bags as illustrated, the aluminum foil forming the inside lining of the bag is physically isolated from the aluminum foil forming the outside of the bag. Not only that, but the inside foil is everywhere kept away from the areas where the sheets are squeezed together, and in fact the inner foil is everywhere separated from the outer foil by two full thicknesses of the un-compressed plastic bubblewrap material.

Removing the inside aluminum foil from the margins is advantageous for two reasons: first, it means the plastic components of the sheets are in direct touching contact at the margins, whereby the plastic components can be welded together at the margins; and second, it allows the inside and outside aluminum foils to be kept everywhere well spaced apart. If the inside and outside foils were allowed to touch, the resulting capacity to conduct heat would destroy much of the insulative nature of the bag. Indeed, if the inside and outside foils were allowed even to be close together (if, for example, the inside and outside foils were separated only by squeezed bubbles), it can be expected that the insulative properties would decline considerably. As shown in the drawings, the inner and outer foils are kept spaced apart everywhere by two thicknesses of un-crushed bubbles.

Fig 9 shows a means for enabling the space between the inner and outer composite sheets to be inflated. The inflating means 50 is made up from two sheets of plain plastic film, which are bonded together over most of their area, except for an intermediate narrow strip 52. The inflating means 50 is trapped between the inner and outer composite layers 28,27, as shown in Fig 9. The un-bonded strip 52 serves as a tube, through which air can be injected into the space 54 between the inner and outer sheets, after the items have been placed in the bag. The inflating means 50 can be withdrawn, prior to sealing the mouth of the bag, or the inflating means can be tucked over, and left in place.

Inflating the space 54 between the base layers of the inner and outer sheets provides a degree of extra packing in the bag, without extra weight or cost. The extra air also provides better insulation. Plastic being slightly permeable to air, only a very low inflation pressure can be sustained over time -- but the bag is intended for short-term packaging.

When the bag is used by a pharmacist, the pharmacist can affix an information label to the outside surface of the bag: it may be noted that the outside of the bag comprises aluminum foil, not plastic bubbles, and so it is easy to fix adhesive labels thereto. It is the intention that the bag as described herein will be placed in a further envelope, for example in a

conventional (cardboard) courier-envelope. Alternatively, the bag as described can be utilised itself as the complete envelope.

The bag as described herein, especially when welded closed, provides a tamper-proof enclosure, in the sense that if the contents are tampered with, that fact is obvious to the recipient. Also, a slip of temperature-sensitive material can be inserted into the bag, which would indicate to the recipient if the temperature inside the bag had risen above (or fallen below) that required to ensure efficacy of the contents.

CLAIM 1. Insulated Transit Bag, as described.

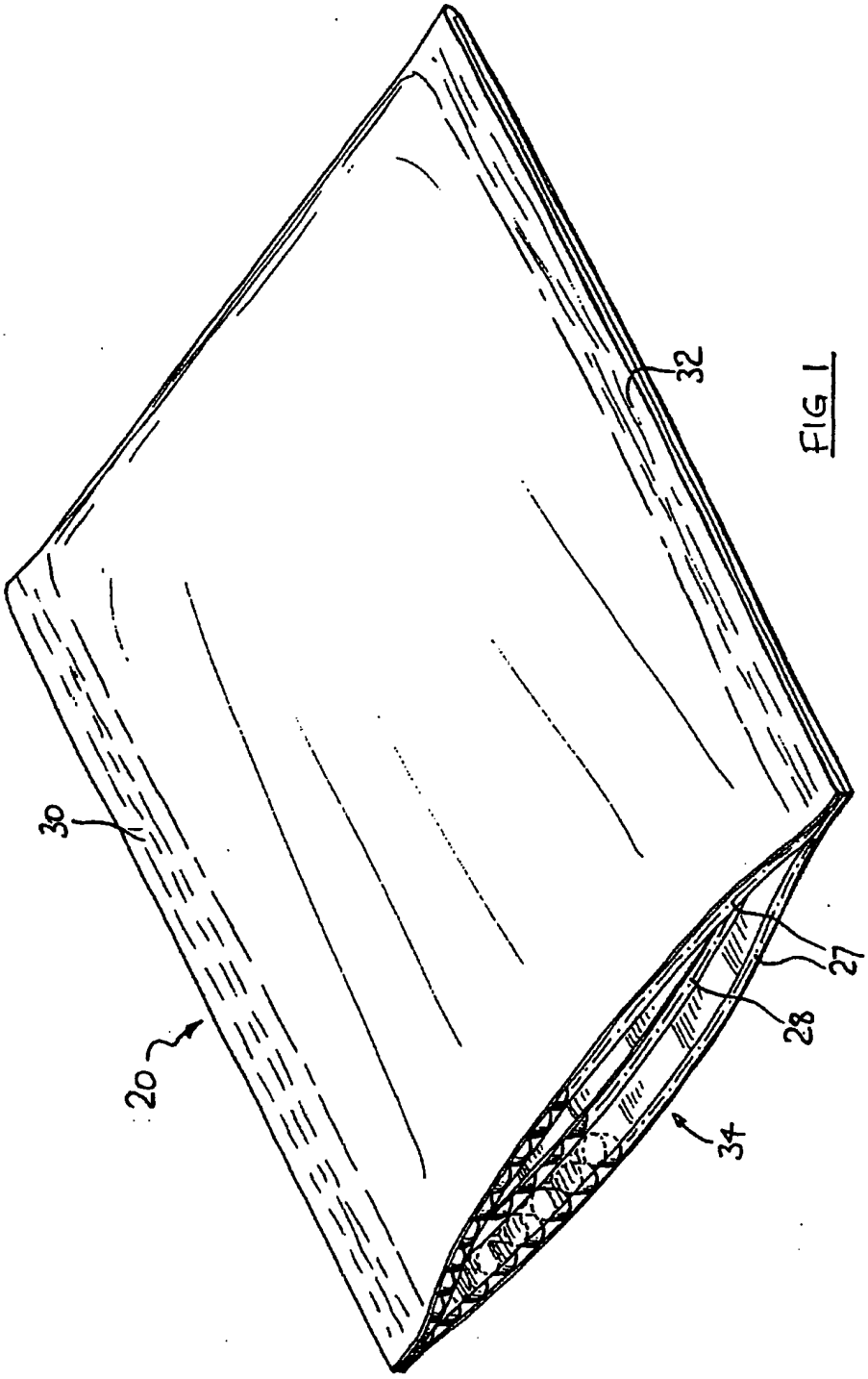


FIG 1

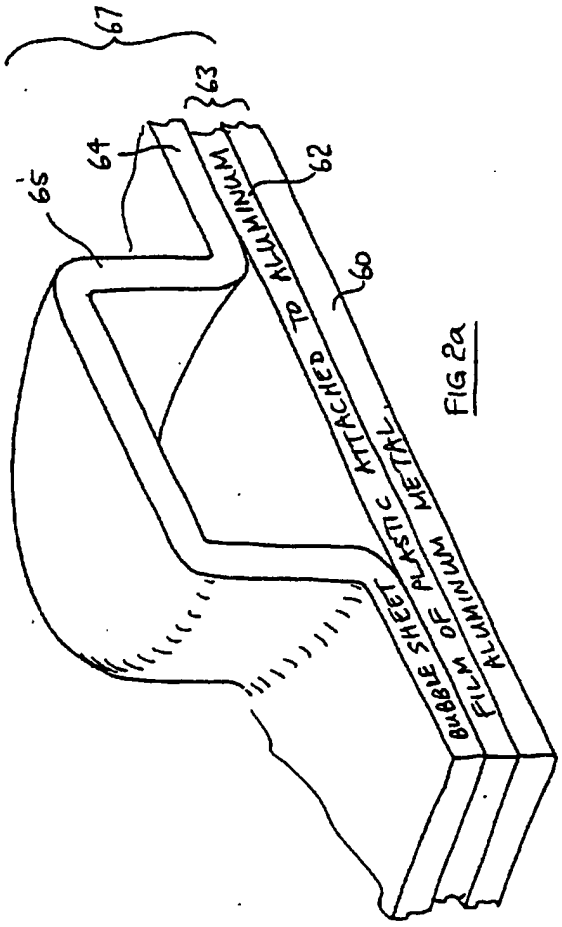

67
63
64
65
62
60
BUBBLE SHEET PLASTIC ATTACHED TO ALUMINUM
FILM OF ALUMINUM METAL

FIG 2a

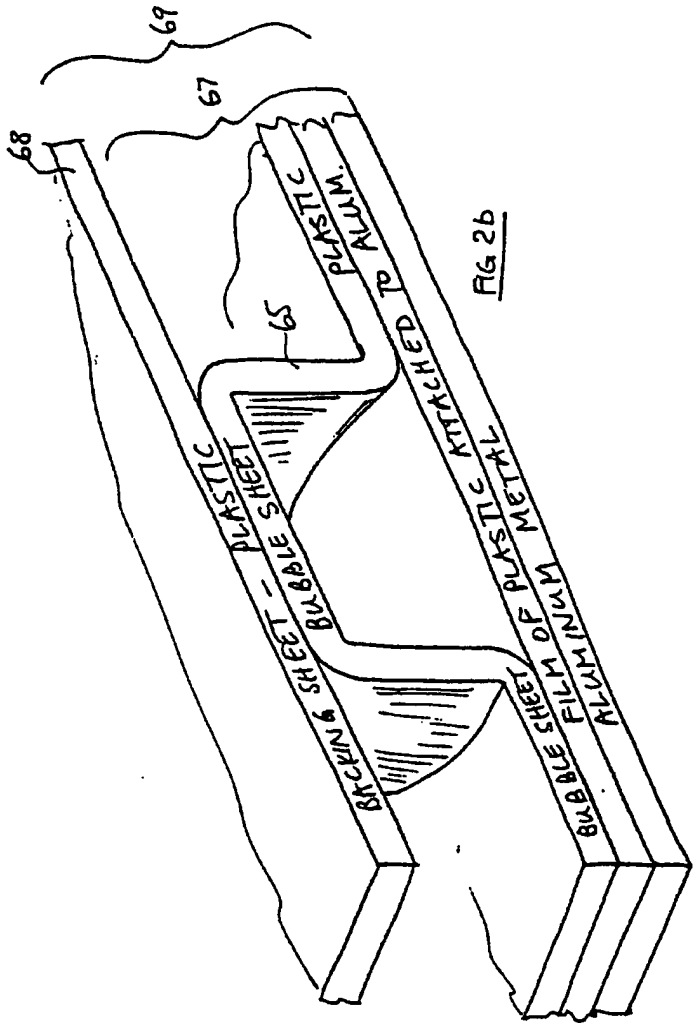

69
67
68
65
PLASTIC
ALUM.
BACKING SHEET - PLASTIC
BUBBLE SHEET
BUBBLE SHEET OF PLASTIC ATTACHED TO
FILM OF
ALUMINUM
METAL

FIG 2b

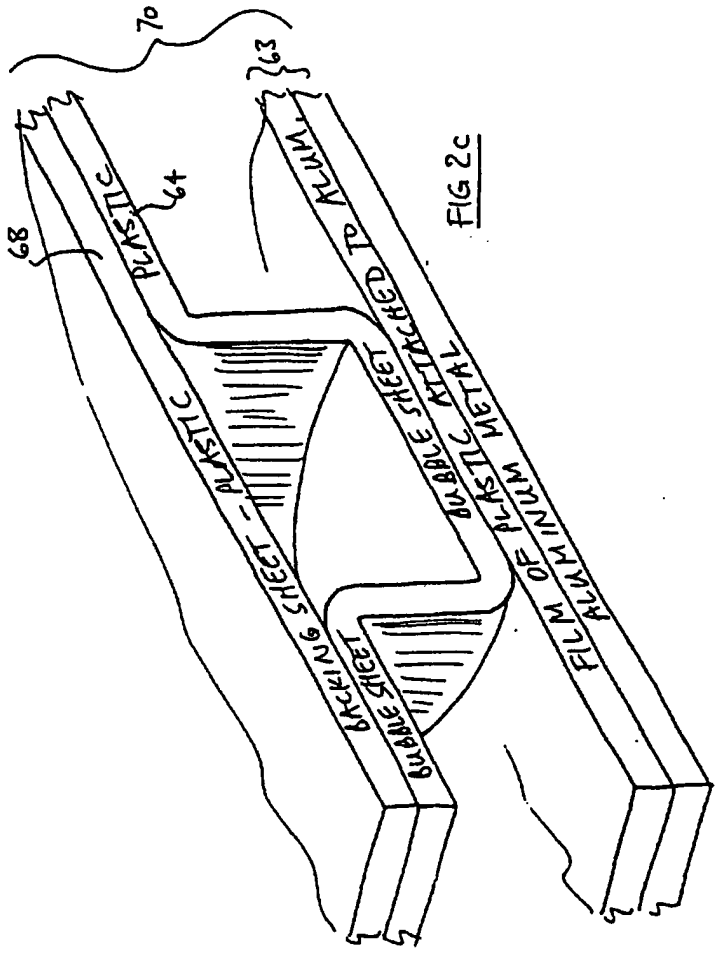

70
63
68
64
PLASTIC
BACKING SHEET - PLASTIC
BUBBLE SHEET
BUBBLE SHEET ATTACHED TO ALUM.
PLASTIC METAL
FILM OF ALUMINUM

FIG 2c

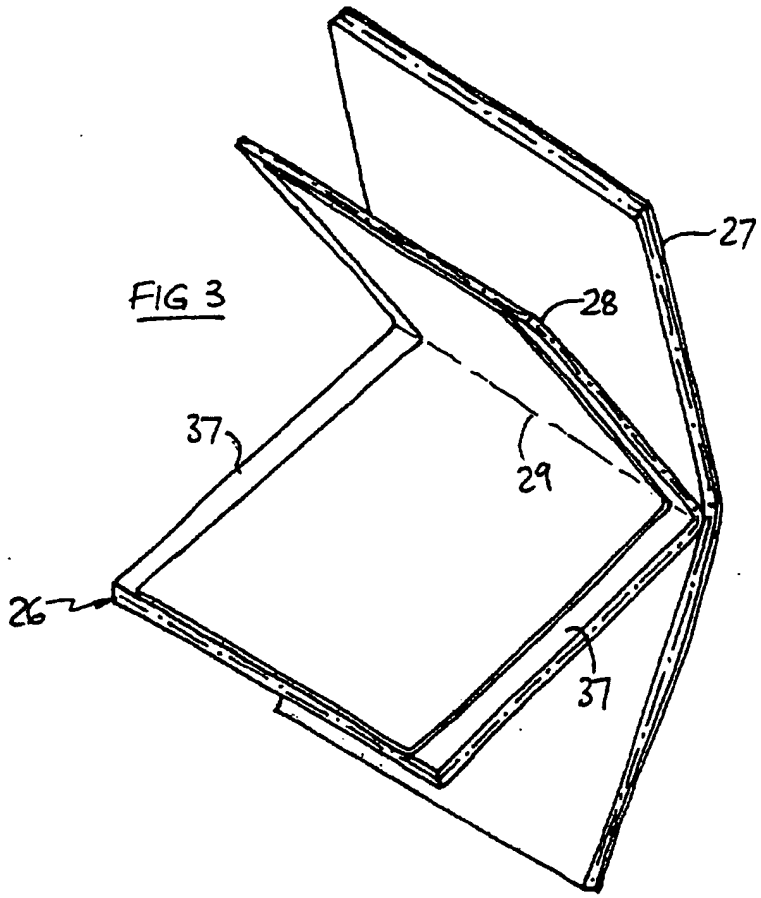


FIG 3

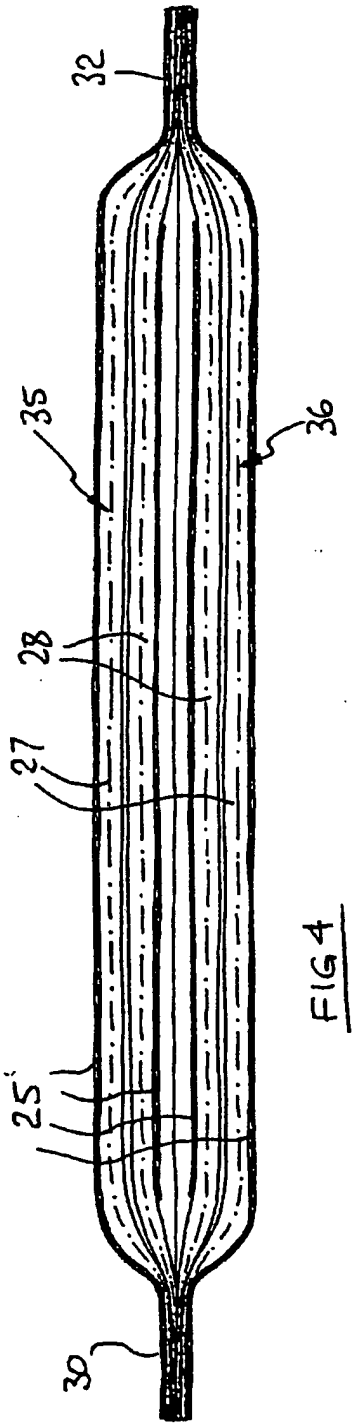


FIG 4

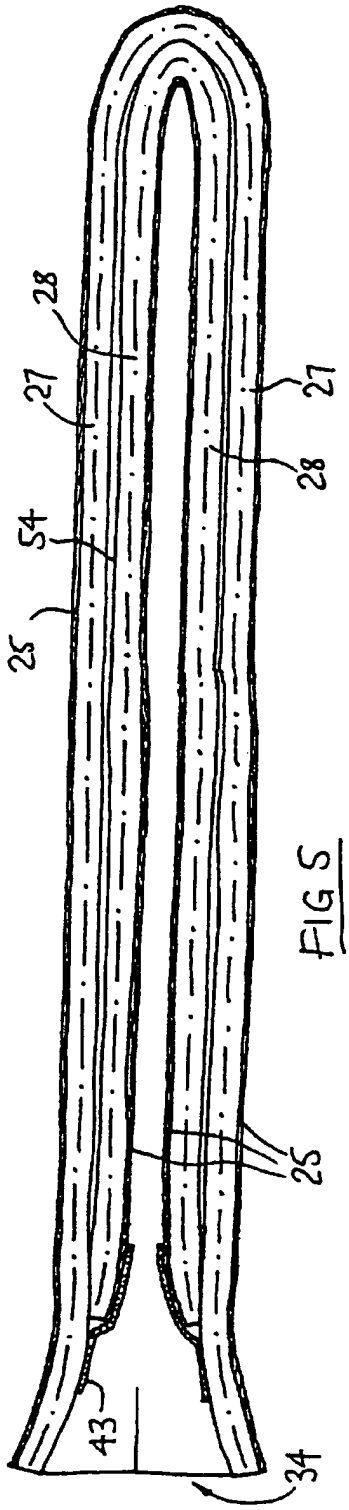


FIG 5

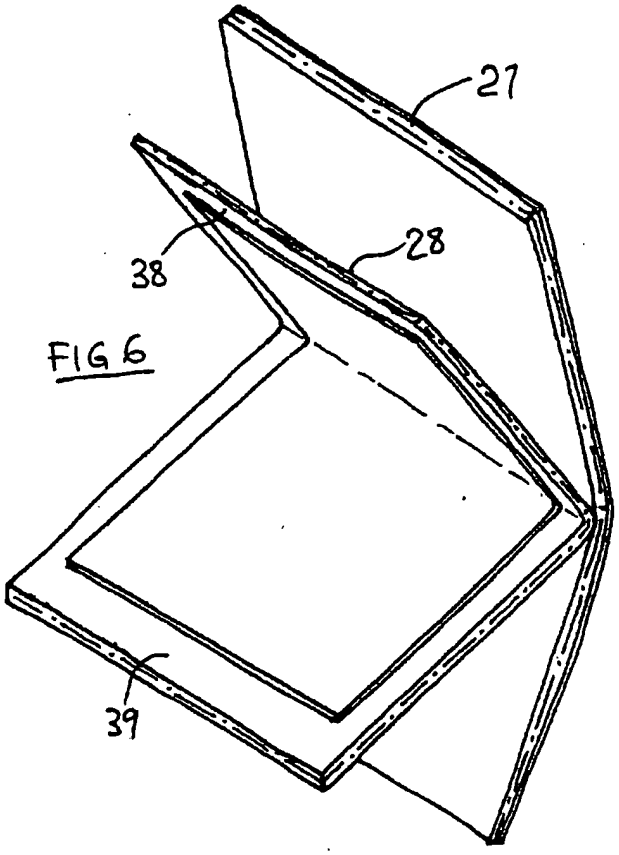


FIG 6

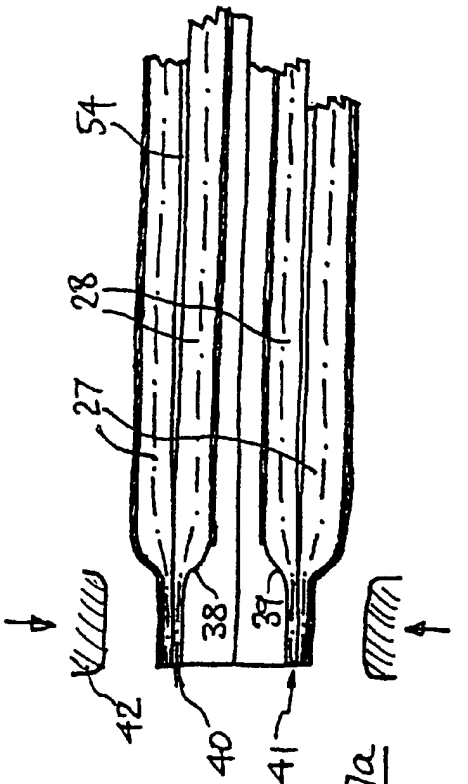


Fig 7a

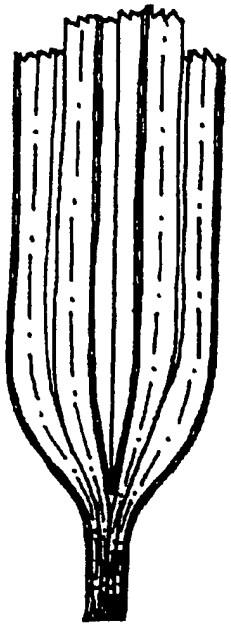


Fig 7b

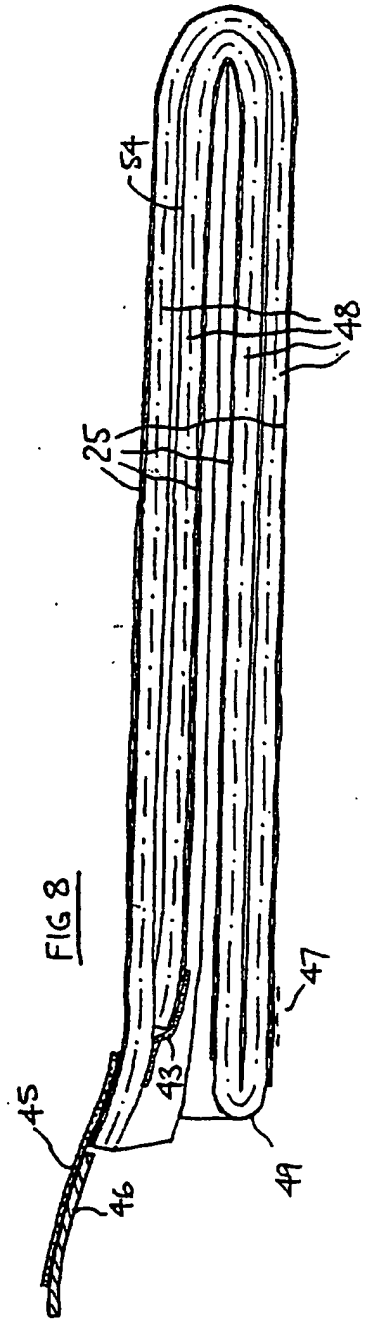


FIG 8

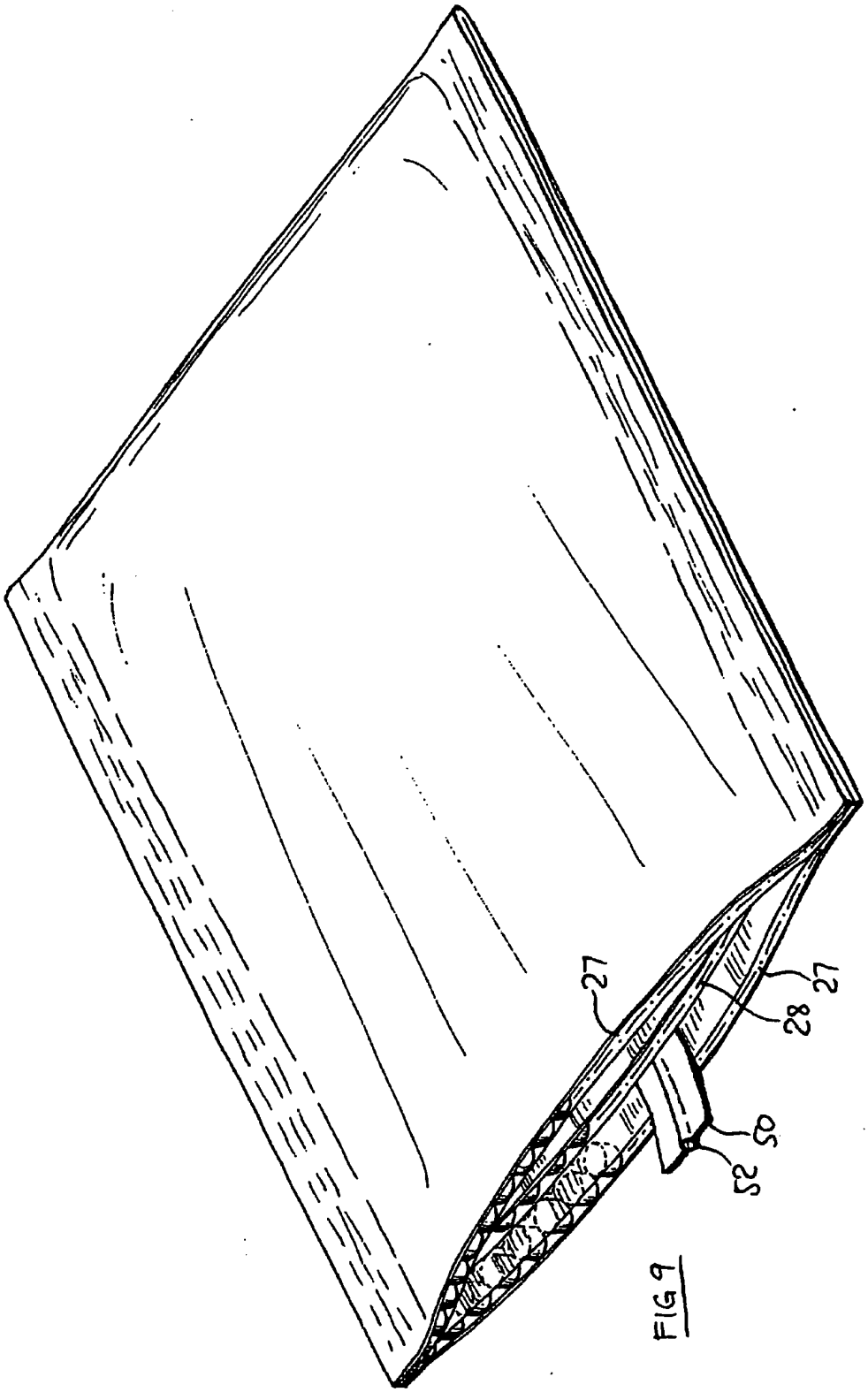


FIG 9